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Notes on Money as Technology

by

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ABSTRACT

Scholars and affiliates of the Levy Economics Institute have long demonstrated a granular understanding of the "operations" of money, which entails understanding the financial system's law and technology (Grey 2019, Tymoigne 2014, Fullwiler 2010, Bell and Wray 2002-3, Bell 2000). During the dot-com bubble, many Levy-affiliated economists underscored the relationship between government fiscal surpluses and unsustainable private debt (Godley and Wray 1999). Recently, scholars have written about the collapse of Silicon Valley Bank (Grey 2023; Tankus 2023) and resurgent speculation in the tech sector (Veneroso and Pasquali 2021). These are but a few examples.

Here, I present some brief thoughts on money as a technology—money itself. I argue there is value in thinking of money not only as a legal institution, political, economic, or social relation but as technology. The exercise sharpens our vision of the future of money even as we continue to believe in radical uncertainty.

I address a few points in this essay. First, I make the case for money as technology. I then survey three applications: 1) the trajectory of state money as a technology of public finance and its relationship to the suppression of indigenous and non-state monies, 2) the regulation of money-like liabilities issued by technology companies, which operate according to the accumulative logic of Silicon Valley rather than Wall Street, and 3) money's future as a technology of surveillance, discipline, and punishment. Finally, I call for scholarship to inform a vision of money as a more democratic technology (per the mission of the Economic Democracy Initiative and Levy Economics Institute).

KEYWORDS: Money, Technology, Neochartalism, Privacy, Surveillance, De-monetization

I. Introduction

Several academic disciplines contain literature regarding “money as a technology,” but the scholarship is loosely connected and the subject is generally undertheorized. When I refer to money as a “technology,” I adopt a practical definition from the “law and technology” literature, itself rooted in an overlapping consensus in the subdiscipline. For Yochai Benkler and Talha Syed: “technology is congealed practical knowledge embedded in material culture” (Allen, Benkler et al. 2023). “Practical knowledge” is knowledge applied functionally to achieve desired outcomes (technology engenders the exercise of power). Benkler adopts the element “embedded” to indicate that technology is distinct from “institutions”—explicit or implicit instructions, serving as constraints and affordances on certain behaviors for people differently situated in social hierarchies. Law produces such institutions and imbues them with legitimate violence. Although technology is undoubtedly social, “artifacts have politics” (Winner 1986). People and institutions struggle over material culture. Indeed, the pluralism we see today in money results from money’s contingent development in certain places, at certain times, according to how power operated. Syed adds the element “congealed” to indicate the friction and time associated with embedding technology.

Money itself fits this definition. As neochartalists and fellow travelers in the legal academy stress, money is a legal institution: it establishes the “rules of the game.” As the canonical line goes, money is “a medium, a measure, a standard, and a store (of value).” Neochartalists build on this definition, most notably adding “tax receivability.” While money is a legal creature, it also helps create the law itself. Money has a constitutional basis, but our constitution also presupposes a public treasury and a particular form of monetary design (Desan 2017; Grey 2024). Some agencies administer money, while others monitor money to regulate other sectors of the economy, shape social relations in private or community spaces, or detect wrongdoing. In private law, money is a key (if often silent) legal concept, dividing law from equity and serving an integral, structural function in property, contract, and tort (Grey and Yuille 2020).

However, money is more than an institution: money helps create the material conditions under which practical knowledge is constituted and executed. To govern, states and other powerful actors embed certain forms of money in legal institutions. However, they also embed money in physical infrastructure and have a material culture. Money congeals into our social and natural lives. We can often touch, smell, or hear it; these features differ across time and place. We have a physical relationship with money, grounded in the objects surrounding us, even if the relationship is increasingly computerized.

Like other technologies, money’s embeddedness within more intricate social systems determines its power. However, as neochartalists stress in different contexts, systems design matters. The shape of money as technology tends to map deeper social hierarchies (Tcherneva 2016), but it also helps create them in the first place. Money eases and tightens constraints on what differently situated people can do practically: it helps make the material conditions of social

organization and relations. Money grants affordance capabilities to some people while harming others. Certain aspects of money—its hardware, software, and user interface—may appear innocuous from a bird's-eye view but are crucial in our discussions of the future of public money.

II. Money and the State

Neochartalists argue states (and other state-like authorities) have crafted money to command labor and resource distribution (Grey, 2019; Tcherneva, 2006; Forstater, 2005; Wray, 2003; Knapp, 1973). However, the type of currency imposes a particular socio-technological system, which takes time to embed in infrastructure and culture. The further beyond state and market observation, the more likely people are to develop alternative monies (Zelizer 1994; Maurer et al. 2018). This includes “social realms” scholars tend to see as separate from the rest of the economy (Harris, Kapczynski, and Zatz 2021). Yet powerful institutions push specific currencies, meaning most subjects develop relations with and around particular forms of technology.

In particular, money serves a central role in data governance. I have surveyed how governments “see through money”—how they use monetary systems to collect and organize data about people to govern society (Carrillo 2023). Generally, governments must improve “legibility” to classify, sort, simplify, and restructure data about subjects to enable social control.

Money, particularly taxation, has played a central, if underappreciated, role in this process. Premodern states lacked the data that eventually allowed them to reliably and systematically extract revenue from subjects (Scott 1998). In different places worldwide, taxation and economic management required the forced creation of official, standardized surnames. Taxpayer identification served as a mode of organizing cities, towns, households, and territories. Some scholars have drawn analogies between the state’s ability to mint money and its power to “mint data” (Fourcade & Gordon 2020). Although a monetary subject may have initially sought anonymity over the state, once the states create the data dossiers, many subjects seek inclusion within government information systems (Gilman 2022).

Of course, there is another side to this story. The imposition of state money has often involved the suppression of Indigenous monies. For instance, during the conquest and genocide of the continent, the United States imposed a centralized account-based trust system on indigenous nations and tribes, divorced from local conceptions of money, which often involved items imbued with value by particular forms of social contact (Park 2016; Banner 2005).

Most currency issuers have chosen a particular form of money to embed within society to mediate our monetary relationships with the state: the commercial bank account. Tech companies stack additional services (often involving mobile apps) on existing banking and telecommunication infrastructure. Some governments have attempted to eliminate the use of non-digital money. My co-panelists at the 2024 Economic Democracy Initiative & Levy Institute workshop on New Directions in Money, Finance & Public Policy, Jayati Ghosh and C. P.

Chandrasekhar, along with co-author Prabhat Patnaik, have analyzed the recent “demonetisation” effort in India (Ghosh et al. 2017). In 2016, in the context of a broader push toward fintech-based payments, nominally to fight fraud and money laundering, Prime Minister Narendra Modi declared two high-value paper notes would no longer be legal tender. Many parts of the economy ground to a halt. People lost their savings, livelihoods, and in some cases their lives as they tried to exchange cash quickly. Cashlessness in El Salvador, Greece, and other countries has resulted in similar harms.

III. Legibility, Credit, and Governance

Multinational corporations are also increasingly issuing their money-like liabilities, introducing a new shadow banking sector. They 'unbundle' the recognizable components, products, and functions of 'legacy' financial institutions like banks and then redistribute them among a network of corporations, often spanning international borders, evading substantive financial regulation and supervision (Awrey and van Zwieten 2018). For instance, companies like Venmo, CashApp, and Coinbase offer “digital wallets,” holding customer balances outside banks, claiming to enable free, faster, fairer transfers. More than a third of U.S. Gen Zers and Millennials, and nearly three in 10 Gen Xers, consider a digital wallet or banking app their primary checking account. These funds are non-FDIC-insured, and the companies evade banking regulation more broadly. In other jurisdictions, such as China, the government has accepted the dominance of these types of companies and maximized data sharing but regulates the companies much more tightly (Carrillo 2024).

Yet the Silicon Valley business model runs on data maximization—they perpetually share data and amplify information under the premise that it will necessarily improve desired outcomes. They make customers more legible, as mass data collection builds consumer profiles and population data. They use these insights to improve their business models and share and sell access to data and information to third parties. Many economists and legal scholars view the increased legibility of modern economies as an unquestionable benefit (Carrillo, 2023). We refer to someone as “credit visible” (legible to credit scoring systems) or “credit invisible” (illegible to credit scoring systems) and push for visibility. This orientation is inseparable from the broader mission to adopt credit as a primary mode of social provisioning (Baradaran 2020; Atkinson 2019).

But for neochartalists, the question, as always, comes down to governance. All legibility tools can coerce certain behaviors according to the interests of influential stakeholders. In particular, technology companies are leveraging data maximization to compete for the role of “functional monetary sovereigns,” especially in the Majority World. In the most ambitious version, Facebook (now Meta) attempted to form a cartel to establish an international “parallel financial services” system. Regulatory agencies and competitors eventually stifled the endeavor,

but Meta’s ambition underscored the risks of Silicon Valley’s involvement in the financial sector (Carrillo 2020).

IV. Data Maximization and Surveillance

Money is also evolving as a technology of surveillance, discipline, and punishment. In most jurisdictions, laws do not meaningfully restrict the government's data acquisition, including data collected by technology companies. Technology companies, financial institutions, and government agencies may engage in reckless data governance, increasing the risk of security breaches and identity fraud or inequitably suspending people from public programs. Consumer and criminal reporting systems collect data about us whether we want them to do so or not. In underappreciated and opaque ways, they make everyday payments more dangerous for many populations. I have studied financial surveillance in immigration enforcement, reproductive healthcare, and re-entry services (Carrillo 2023).

While governments enhance their gaze, the public does not see, much less understand, this power. Individual users may think the benefits of payment data maximization outweigh the harms, which seem remote. However, individuals cannot assess the possibility of social harm because institutions use the data to make population-level insights. As more users relinquish privacy, institutions aggregate more data, and we increase the risk of privacy violations and consequent material harm for each user, specific populations, and the public.

From another angle, governments are experiencing difficulty preventing fraud and white-collar crime. As Bill Black has long stressed, deregulation can lead to rampant fraud and money laundering (Black 2010). In the wake of these regulatory limitations, especially in handling cryptocurrency fraud, policymakers in both parties have turned to criminal law enforcement as an alternative solution. Some national and international authorities have sufficient legal authority and platform power to mass surveil financial systems. However, most institutions have used them to fight wars on drugs and terrorism rather than fraud and public corruption.

V. Money as a Democratic Technology

Policymakers now face a unique opportunity to build democratic money. Currency issuers are designing “digital fiat currency” (DFC)—public money native to government computers. In principle, governments could distribute this money directly to individuals, households, and businesses, bypassing commercial banking and tech companies. In other words, DFC systems could establish direct digital financial links between states and subjects for the first time in history. However, in most places, the future looks grim for democracy, gearing toward

private sector platforms, networks, utilities, data maximization, and operational and financial fragility. There is also a specter of toxification of money's material culture.

For instance, many progressives rightly want to construct public banking systems. My colleague Rohan Grey and I have argued that we should hardwire principles and values into components of DFC systems such that violating them is impossible or nearly impossible (Carrillo 2023). For example, to mitigate the misuse and abuse of payment data in a reconstructed system, Grey and I have argued governments should create true “digital cash” or “e-cash” as well as public bank accounts. Apps and “smartcards,” similar in size to existing debit cards, would not make payments over the internet. Instead, they would store money “offline”—on the card hardware rather than software—and transfer money directly between devices. People would use the cards for everyday small-dollar transactions, but the cards would not be capable of generating data that companies and agencies could exploit. We can incorporate a truly inclusive layer within a digital public money system.

This is but one proposal for money as a democratic technology. We must envision legal and technological structures that balance the need for digital development against the risk of harm to the public and specific groups. Right now, the rooms of central bankers are determining the future of money. The future of money should be an open and public discussion. The stakes are high, and there is much more work to do from here to which scholars of the Levy Institute can contribute.

Citations:

- Allen, Danielle, Yochai Benkler, Leah Downey, Rebecca Henderson, and Josh Simons. 2022. “Power and Productivity: Institutions, Ideology, and Technology in Political Economy” in *A Political Economy of Justice*, pp. 37, 54.
- Atkinson, Abbye. 2019. Rethinking Credit as Social Provision, 71 *Stanford Law Review*. 1093, 1160-61.
<https://review.law.stanford.edu/wp-content/uploads/sites/3/2019/05/Atkinson-71-Stan.-L.-Rev.-1093-2019.pdf>
- Awrey, Dan & van Zwieten, Kristin. 2018. The Shadow Payment System. 43 *Journal of Corporation Law* 775. <https://scholarship.law.cornell.edu/facpub/1715/>
- Banner, Stuart. 2005. *How the Indians Lost Their Land: Law and Power on the Frontier*. Harvard University Press. <https://doi.org/10.2307/j.ctvjf9vqr>
- Baradaran, Mehrsa. 2020. Banking on Democracy. 98 *Washington University Law Review*. 353, 356.
https://openscholarship.wustl.edu/cgi/viewcontent.cgi?article=6427&context=law_lawreview
- Bell, S. 2000. Do Taxes and Bonds Finance Government Spending? *Journal of Economic Issues*, 34(3), 603–620. <https://doi.org/10.1080/00213624.2000.11506296>
- Bell, S., Wray, L.R. 2002–2003. Fiscal Effects on Reserves and the Independence of the Fed. *Journal of Post Keynesian Economics*, 25(2), 263–271.
<http://www.jstor.org/stable/4538827>
- Ben-Shahar, Omri. 2019. Data Pollution. 11 *Journal of Legal Analysis* 104, 140.
<https://ssrn.com/abstract=3191231>
- Black, William K. 2010. *The Best Way to Rob a Bank Is to Own One*. pp. 1-16. University of Texas Press. <https://utpress.utexas.edu/9780292754188/>
- Carrillo, Raúl. 2023. Seeing Through Money: Democracy, Data Governance, and the Digital Dollar, 57 *Georgia Law Review* 1207.
<https://georgialawreview.org/article/84224-seeing-through-money-democracy-data-governance-and-the-digital-dollar>

- Carrillo, Raúl. Forthcoming 2024. Platform Money, *Yale Journal of Regulation*
(Manuscript on file with Author)
- Carrillo, Raúl. 2020. “Banking On Surveillance: The Libra Black Paper,” for Financial Reform Education Fund & Demand Progress Education Fund. p. 5.
<https://Ourfinancialsecurity.Org/Wp-Content/Uploads/2020/06/Libra-Black-Paper-Final-2.Pdf>.
- Desan, Christine. 2017. “The Constitutional Approach to Money: Monetary Design and the Production of the Modern World,” in Bandelj and Wherry, eds. *Money Talks: Essays in Honor of Viviana Zelizer*. Princeton: Princeton University Press.
- Forstater, M. 2006. “Tax-driven money: Additional evidence from the history of thought, economic history, and economic policy”, in M. Satterfield (ed.), *Complexity, Endogenous Money, and Exogenous Interest Rates*. Cheltenham, UK and Northampton, MA, USA: Edward Elgar.
- Fourcade, Marion and Jeff Gordon. 2020. Learning Like a State: Statecraft in the Digital Age. *Journal of Law and Political Economy* 1. Retrieved from
<https://escholarship.org/uc/item/3k16c24g>
- Fullwiler, Scott. 2010. Modern Monetary Theory - A Primer on the Operational Realities of the Monetary System. Available at SSRN: <https://ssrn.com/abstract=1723198> or
<http://dx.doi.org/10.2139/ssrn.1723198>
- Gilman, Michele. 2022. Me, Myself, and My Digital Double: Extending Sara Greene's Stealing (Identity) from the Poor to the Challenges of Identity Verification. 106 *Minnesota Law Review*, Headnotes 301, pp. 309–10.
- Godley, W., and L. R. Wray. 1999. Can Goldilocks Survive? Levy Economics Institute, Policy Note 1999/4. Annandale-on-Hudson, NY: Levy Economics Institute of Bard College.
<https://www.levyinstitute.org/publications/can-goldilocks-survive>
- Grey, Rohan. Forthcoming. Spending Money: Fiscal Policy in the Era of Digital Currency, (manuscript on file with author).
- Grey, Rohan. 2019. Monetary Resilience, 41 *W. New England Law Review*, 505.
<https://digitalcommons.law.wne.edu/lawreview/vol41/iss3/4>

- Grey, Rohan. 2019. “Banking in a Digital Fiat Currency Regime”, in Philipp Hacker et al. Eds. *Regulating Blockchain: Techno-Social and Legal Challenges* (), Oxford University Press
- Grey, Rohan. 2023. “Never Let A Crisis Go To Waste W/Rohan Grey”, Money on the Left Podcast, (Bonus Episode).
<https://moneyontheleft.org/2023/03/17/never-let-a-crisis-go-to-waste-w-rohan-grey-bonus-episode/>
- Harris, Angela P., Amy Kapczynski, Noah Zatz. 2021. “Where is the Political Economy?” Law and Political Economy Project blog, June.
<https://lpeproject.org/blog/where-is-the-political-economy/>
- Knapp, G. 1973 [1924]. *The State Theory of Money*. Clifton, NY: Augustus M. Kelley.
- Maurer, Bill et al. eds. 2018. *Money At The Margins: Global Perspectives On Technology, Financial Inclusion, And Design*. 2. Berghahn Book. The Human Economy Volume 6.
<https://doi.org/10.3167/9781785336539>
- Park, K-Sue. 2016. Money, Mortgages, and the Conquest of America. 41(4) *Law & Social Inquiry* 1006, 1029. <https://www.jstor.org/stable/26630897>
- Pasquale, Frank. 2020. *The New Laws of Robotics*. Harvard University Press.
- Scott, James C. 1998. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. Pp. 2-3, 183-184. Yale University Press: New Haven and London.
- Tankus, Nathan. 2023. “Every Complex Banking Issue All at Once: The Failure of Silicon Valley Bank in One Brief Summary and Five Quick Implications.” Notes on the Crises.
<https://www.crisisnotes.com/every-complex-banking-issue-all-at-once-the-failure-of-silicon-valley-bank-in-one-brief-summary-and-five-quick-implications/>
- Tcherneva, Pavlina R. 2006. “Chartalism and the Tax-Driven Approach to Money,” in P. Arestis and M. Sawyer eds. *Handbook of Alternative Monetary Economics*. Northampton, MA: Edward Elgar.
<https://www.retemmt.it/wp-content/uploads/2018/07/Tcherneva-P.R.-Chartalism-and-the-Tax-Driven-Approach-to-Money.pdf>
- Tcherneva, Pavlina R. 2016. Money Power and Monetary Regimes. Levy Economics Institute, Working Paper 861.
<https://www.levyinstitute.org/publications/money-power-and-monetary-regimes>

- Tymoigne, E. 2014. Modern Money Theory, and Interrelations Between the Treasury and Central Bank: The Case of the United States. *Journal of Economic Issues*, 48(3), 641–662.
<http://www.jstor.org/stable/43905834>
- Veneroso, Frank and Pasquali, Mark. 2021. The Souk Al-Manakh: The Anatomy of a Pure Price-Chasing Bubble. Levy Economics Institute, Working Papers Series, Available at SSRN: <https://ssrn.com/abstract=3809955> or <http://dx.doi.org/10.2139/ssrn.3809955>
- Winner, Langdon. 1986. "Do Artifacts Have Politics?" In Langdon Winner eds. *The Whale and the Reactor: A Search for Limits in an Age of High Technology*. 19-39. Chicago: University of Chicago Press, 1986.
- Wray, L.R. 2003b. "The neo-chartalist approach to money", in Bell, S., Nell, E. eds. *The State, the Market and the Euro*. Cheltenham, UK and Northampton, MA, USA: Edward Elgar, 89–110.
<https://edi.bard.edu/research/notes/cfeps-wp-10-the-neo-chartalist-approach-to-money-l-r-andall-wray>
- Wray, L. R. 2007. Lessons from the Subprime Meltdown. The Levy Economics Institute, Working Paper No. 522.
<https://www.levyinstitute.org/publications/lessons-from-the-subprime-meltdown>
- Zelizer, Viviana. 1997. *The Social Meaning of Money*. Princeton University Press, pp. 18-26.